



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

June 23, 2015

Mr. Thomas A. Vehec
Vice President
NextEra Energy Duane Arnold, LLC
3277 DAEC Road
Palo, IA 52324-9785

**SUBJECT: DUANE ARNOLD ENERGY CENTER – NOTIFICATION OF AN NRC TRIENNIAL
HEAT SINK PERFORMANCE INSPECTION AND REQUEST FOR INFORMATION
INSPECTION REPORT 05000331/2015003**

Dear Mr. Vehec:

On August 24, 2015, the U.S. Nuclear Regulatory Commission (NRC) will begin the on-site portion of the Triennial Heat Sink Performance Inspection at your Duane Arnold Energy Center. This inspection will be performed in accordance with NRC Baseline Inspection Procedure 71111.07.

In order to minimize the impact that the inspection has on the site, and to ensure a productive inspection, we have enclosed a request for documents needed for the inspection. The documents have been divided into three groups:

- The first group lists information necessary for our initial inspection scoping activities. This information should be available to the lead inspector no later than July 14, 2015.
- The second group is needed to support our in-office preparation activities. This set of documents, including the calculations associated with the Residual Heat Removal heat exchanger, should be available at the Regional Office no later than August 12, 2015. This information should be separated based on the item numbers identified on the enclosed list, especially if provided electronically (e.g., folder with I.1, I.2, etc.). During the in-office preparation activities, the inspector may identify additional information needed to support the inspection.
- The last group includes the additional information above as well as plant-specific reference material. This information should be available on-site to the inspector on August 24, 2015. It is also requested that corrective action documents and/or questions developed during the inspection be provided to the inspector as the documents are generated.

All requested documents are to be for the time period from the on-site inspection period back to the documents that were provided in response to the previous Heat Sink Performance Inspection. If no activities were accomplished in that time period, then the request applies to the last applicable document in the previous time period. It is important that these documents be as complete as possible, in order to minimize the number of documents requested during the preparation week or during the on-site inspection.

The lead inspector for this inspection is Mr. Andrew Dunlop. We understand that our regulatory contact for this inspection is Mr. Robert Murrell of your organization. If there are questions about the material requested, or the inspection, please call Mr. Andrew Dunlop at (630) 829-9726. Please send the information via electronic media, or to the following e-mail address Andrew.Dunlop@nrc.gov. A hard-copy with the required information is also an acceptable option.

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, Control Number 3150-0011. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid Office of Management and Budget Control Number.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA/

Christine A. Lipa, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-331; 72-032
License No. DPR-49

Enclosure:
Triennial Heat Sink Performance Inspection
Document Request

cc w/encl: Distribution via LISTSERV®

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

Inspection Report: 05000331/2015003

Inspection Dates: August 24-28, 2015

Inspection Procedure: IP 71111.07, "Heat Sink Performance"

<u>Inspectors:</u>	Andrew Dunlop (630) 829-9726 Andrew.Dunlop@nrc.gov	Lionel Rodriguez (630) 829-9609 Lionel.Rodriguez@nrc.gov
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I. Information Requested By July 14, 2015:

1. Copy of heat exchanger performance trending data tracked for both Residual Heat Removal (RHR) heat exchangers (A/B).
2. List of Corrective Action Program (CAP) documents, with a short description, associated with the RHR heat exchangers (A/B), heat sinks, silting, corrosion, fouling, or heat exchanger testing, for the previous 3 years, or since the last CAP document list was sent to the NRC for the previous Heat Sink Performance Inspection. The list should include all CAP documents not on the last CAP document list.
3. Copy of any self-assessment done on any of Generic Letter (GL) 89-13 heat exchangers.
4. Last two System Health Report(s) and maintenance rule system notebooks for the RHR heat exchangers (A/B), and the GL 89-13 Program, as applicable.
5. List of engineering-related operator workarounds, with a short description, associated with the RHR heat exchangers (A/B) initiated in the past 3 years.
6. List of permanent and temporary modifications, with a short description, associated with the RHR heat exchangers (A/B) initiated in the past 3 years.

II. Information Requested By August 12, 2015:

1. Copies of the GL 89-13 responses.
2. Copy of the Updated Final Safety Analysis Report (UFSAR) section applicable to the GL 89-13 Heat Exchanger Program.
3. Copies of procedures developed to implement the recommendations of GL 89-13 (e.g. the GL 89-13 Heat Exchanger Program description).
4. Copies of the selected CAP documents.

Enclosure

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

5. For the RHR heat exchanger 'A':
 - a. Copies of the UFSAR sections applicable for the RHR heat exchanger 'A'.
 - b. Copy of system description and design basis document for the RHR heat exchanger 'A' (as applicable).
 - c. Provide a list of calculations (with a short description) which currently apply to the RHR heat exchanger 'A':
 - i. establish the limiting design basis heat load required to be removed by the RHR heat exchanger 'A';
 - ii. demonstrate the RHR heat exchanger 'A' capacity to remove the limiting heat load;
 - iii. correlate surveillance testing and/or inspection results from the RHR heat exchanger 'A' with design basis heat removal capability (e.g., basis for surveillance test and/or inspection acceptance criteria);
 - iv. evaluate the potential for water hammer in the RHR heat exchanger 'A' or associated piping; and
 - v. evaluate excessive tube vibration in the RHR heat exchanger 'A'.
 - d. Copy of any operability determinations or other documentation of degradation associated with the RHR heat exchanger 'A' or the systems that support the operation for the heat exchanger.
 - e. Copy of the construction code, Design Specification, heat exchanger data sheets, and vendor documents including component drawings applicable for the RHR heat exchanger 'A'.
 - f. Copies of normal, abnormal, and emergency operating procedures associated with the RHR heat exchanger 'A'.
6. For the ultimate heat sink (UHS) and the safety-related service water system (or equivalent):
 - a. Copies of the applicable UFSAR sections.
 - b. Copy of system description and design basis document (as applicable).
 - c. Copy of any operability determinations or other documentation of degradation associated with the UHS, and the safety-related service water system.
 - d. Copy of the document (e.g., UFSAR or Technical Requirements Manual) that states the maximum cooling water system inlet temperature limit that still allows full licensed power operation of the nuclear reactor.
 - e. Copy of system description and design basis document (as applicable).

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- f. Copy of the construction code and Design Specification.
 - g. Copies of normal, abnormal, and emergency operating procedures associated with the UHS and safety-related service water systems, including procedures for loss of these systems.
 - h. Copy of any operability determinations or other documentation of degradation associated with the UHS and the safety-related service water system.
 - i. Copies of corrective action documents associated with waterhammer or hydraulic transients in the service water system since the last Heat Sink Inspection.
 - j. If available, provide an electronic copy of piping and instrumentation diagrams (P&IDs) for the service water system, including the intake structure.
 - k. Provide a list of calculations (with a short description), which currently apply to UHS and service water system.
 - l. Provide a list of instruments (with a short description) associated with automatic or alarm functions for the safety-related service water system and/or UHS.
 - m. Provide a list of any design change (with a short description) performed on the UHS or safety-related service water system since the last heat sink performance inspection.
7. A schedule of all inspections, cleanings, maintenance, or testing of any safety-related plant heat exchanger to be performed during the on-site portion of the inspection.

III. Information Requested to be Available on First Day of Inspection, August 24, 2015

- 1. For the RHR heat exchanger 'A':
 - a. Copy of the calculation which correlates surveillance testing results with design basis heat removal capability (e.g. basis for surveillance test acceptance criteria).
 - b. Copies of the two most recent completed tests and evaluation data confirming thermal performance which are performance tested.
 - c. Documentation and procedures that identify the types, accuracy, and location of any special instrumentation used for the two most recently completed thermal performance tests for RHR heat exchanger 'A' (e.g., high accuracy ultrasonic flow instruments or temperature instruments). Include calibration records for the instruments used during these tests.
 - d. Information regarding any alarms which monitor on-line performance.

TRIENNIAL HEAT SINK PERFORMANCE INSPECTION DOCUMENT REQUEST

- e. Copy of the document describing the inspection results of the RHR heat exchanger 'A'.
 - f. The cleaning and inspection maintenance schedule for the RHR heat exchanger 'A' for the next 5 years.
 - g. Copy of the design specification and heat exchanger data sheets for the RHR heat exchanger 'A'.
 - h. Copy of the vendor manuals including component drawings for the RHR heat exchanger 'A'.
 - i. Copy of the calculation which establishes the limiting (maximum) design basis heat load which is required to be removed by the RHR heat exchanger 'A'.
 - j. Copy of the operating procedure that ensures that the maximum cooling water system inlet temperature limit is not exceeded.
 - k. Copy of the calculations or documents which evaluate the potential for water hammer in the RHR heat exchanger 'A' or associated piping.
 - l. Copy of the calculations that evaluate excessive tube vibration in the RHR heat exchanger 'A', and the documents that describe the controls that prevent heat exchanger degradation due to excessive flow induced vibration during operation.
 - m. Copy of the periodic flow testing at or near maximum design flow.
 - n. Copy of the document which identifies the current number of tubes in service for the RHR heat exchanger 'A', and the supporting calculation which establishes the maximum number of tubes which can be plugged in the RHR heat exchanger 'A'.
 - o. Copy of the document establishing the repair criteria (plugging limit) for degraded tubes which are identified in the RHR heat exchanger 'A'.
 - p. Copies of the documents that verify the structural integrity of the RHR heat exchanger 'A' (e.g. eddy current summary sheets, ultrasonic testing results, and visual inspection results).
 - q. Copies of those documents that describe the methods taken to control water chemistry in the RHR heat exchanger 'A'.
2. For the review of the performance testing of the safety-related service water system (or equivalent) and the UHS:
- a. Copies of the last two performance tests, such as the ASME in-service test, for the pumps, valves, tower fans in the safety-related service water system. If the components are not performance tested, please provide documentation verifying performance by the methods actually used.

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- b. Copies of the documents that demonstrate that flow balance testing was performed during the last 3 years. If the last flow test was performed longer than 3 years, then provide the last flow test.
 - c. Copies of the documents that demonstrate that flow balance testing will continue to be periodically done in the future.
 - d. Copies of procedures used to monitor interface valves between the safety related section of the service water system and the non-safety related section and the associated results.
 - e. Copies of the procedures that verify the performance of risk significant non-safety functions and the associated results.
3. For the review associated with the system walkdown of the service water intake structure:
- a. Copies of corrective maintenance for the last 6 years, associated with service water strainers, traveling screens and trash racks.
 - b. Copies of the last two inspections and/or surveillances, associated with service water strainers, traveling screens and trash racks.
 - c. List of preventive maintenance, including frequency, associated with service water strainers, traveling screens and trash racks.
 - d. Copies of abnormal procedures for the traveling screens and service water strainers.
 - e. Copies of the last two inspections and/or surveillances documenting that component mounts have not excessively degraded (i.e., due to corrosion). For example, inspections for the mounts for the service water pumps, service water strainers, traveling screens and trash racks.
 - f. Copies of the documents associated with the monitoring, trending, and remediation of silt accumulation at the service water pump bay.
 - g. Copies of surveillance procedures and testing results performed on the service water pump bay water level instruments.
 - h. Copies of procedures associated with operating during adverse weather conditions (e.g., icing, high temperatures, or low level).
 - i. Copy of the evaluation for the potential effects of low flow/level on underwater weir walls intended to limit silt or sand intake, if applicable.

If the information requested above will not be available, please contact Mr. Andrew Dunlop as soon as possible at (630) 829-9726, or e-mail Andrew.Dunlop@nrc.gov.

T. Vehec

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Sincerely,

/RA/

Christine A. Lipa, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 50-331; 72-032
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Enclosure:
Triennial Heat Sink Performance Inspection
Document Request

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Letter to Thomas A. Vehec from Christine A. Lipa dated June 23, 2015

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